

We claim:

1. A process for preparing acid formates which comprises

5 (a) partially hydrolyzing methyl formates with water;

10 (b) separating off by distillation methyl formate and methanol from the reaction mixture obtained in process stage (a), forming a stream comprising formic acid and water; and

15 (c) combining the stream comprising formic acid and water from the process stage (b) with the corresponding formate forming a mixture comprising the acid formate and water.

2. A process as claimed in claim 1, wherein, in the process stage (a), the methyl formate and the water are fed in a molar ratio of 0.1 to 1.

20 3. A process as claimed in claims 1 to 2, wherein the methyl formate separated off in process stage (b) is recirculated to process stage (a).

25 4. A process as claimed in claims 1 to 3, wherein, in the process stage (d)

30 (i) the stream comprising the formic acid and the water from the process stage (b), together with the mother liquor recirculated from step (iv), is concentrated in a column or an evaporator with removal of water by distillation;

35 (ii) the stream which was produced from step (i) by concentration and comprises formic acid, water and formate is combined with the corresponding formate, forming a mixture comprising the acid formate and water;

40 (iii) solid acid formate from the mixture comprising acid formate and water obtained from step (ii) is precipitated by crystallization and this is isolated; and

45

2 Drawings

ART 34 AMDT

- (iv) the resultant mother liquor is recirculated to step (i).
5. A process as claimed in claims 1 to 3, wherein, in process stage (c)
- (i) the stream from the process stage (b) comprising the formic acid and the water and the corresponding formate are combined to form a mixture comprising the acid formate and water in a column or an evaporator with removal of water by distillation; and
- (ii) solid acid formate is separated off by spray granulation, spray drying or melt crystallization from the mixture obtained from step (i) comprising acid formate and water, and this solid acid formate is isolated.
6. A process as claimed in claims 1 to 5, wherein the acid formate prepared is an acid metal formate and the metal formate to be supplied in process stage (c) is produced by carbonylating the corresponding metal hydroxide.
7. A process as claimed in claim 6, wherein
- (i) the carbonylation is carried out in the presence of methanol as catalyst;
- (ii) the resultant reaction mixture comprising metal formate, water and methanol together with the stream comprising methanol with or without methyl formate from the process stage (b) is separated by distillation into a stream comprising methanol, with or without a stream comprising methyl formate and a stream comprising the metal formate and water; and
- (iii) the resultant stream comprising the metal formate and water is fed to the process stage (c).
8. A process as claimed in claims 1 to 7, wherein the acid formate prepared is acid potassium formate, acid sodium formate, acid calcium formate or mixtures thereof.
9. A process as claimed in claims 1 to 8, wherein the acid formate prepared is potassium diformate, sodium diformate, sodium tetraformate or mixtures thereof.

ART 34 ANDT

10. An apparatus for preparing acid formates as claimed in claims 1 to 9, comprising:
- (a) a reactor (A) suitable for hydrolyzing methyl formate;
 - (b) a column (B) suitable for separating by distillation a stream comprising methyl formate, formic acid, methanol and water into methyl formate, methanol and a stream comprising formic acid and water, which column is connected on the feed side to the reactor (A);
 - (c) a column (E) suitable for removing water from a stream comprising formic acid and water, which column is connected on the feed side to the column bottom of column (B);
 - (d) an apparatus (G) suitable for crystallizing acid formate, which apparatus is connected on the feed side to the column bottom of column (E) and to a possible supply of aqueous formate;
 - (f) an apparatus (F) suitable for separating off crystals of the acid formate, which apparatus is connected on the feed side to apparatus (G); and
 - (g) a connection line (17) between apparatus (F) and column (E), which connection line is suitable for recirculating mother liquor.
11. An apparatus for preparing acid formates as claimed in claims 1 to 9, comprising:
- (a) a reactor (A) suitable for hydrolyzing methyl formate;
 - (b) a column (B) suitable for separating by distillation a stream comprising methyl formate, formic acid, methanol and water into methyl formate, methanol and a stream comprising formic acid and water, which column is connected on the feed side to the reactor (A);
 - (c) a column (E) suitable for removing water from a stream comprising formic acid and water, which column is connected on the feed side to the column bottom of column (B);

APR 24 1967

22

(e) a possible supply to the column (E), which possible supply is suitable for feeding aqueous formate; and

5 (f) an apparatus (G) suitable for spray granulation, spray drying or melt crystallization, which apparatus is connected on the feed side to the column bottom of column (E).

10

15

20

25

30

35

40

45